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31-Oct-06

Federal Communications Commission
445 12th Street, S.W.
Washington D.C. 20544

Re: Investigation of the Spectrum Requirements for Advanced Medical Technologies, ET Docket 06-135

To whom it may concern:

Thank you for the opportunity to comment on the Notice of Inquiry, Notice of Proposed Rule Making, and Order (FCC 06-103).

The Cleveland FES Center is a research consortium that develops advanced technology for restoring function in individuals with neurological deficits. The Center focuses on the application of low-level electrical currents to either generate or suppress activity in the nervous system. This technique is known as functional electrical stimulation (FES). FES can produce and control the movement of otherwise paralyzed limbs for standing and hand grasp, activate visceral bodily functions such as bladder control or respiration, create perceptions such as skin sensibility, arrest undesired activity such as pain or spasm, and facilitate natural recovery and accelerate motor relearning.

The Cleveland FES Center has been a world leader in the design, fabrication, and clinical deployment of implantable FES systems since the early 1980's; the first such system was implanted in a human in 1986.

The Cleveland FES Center is currently pursuing next generation system designs. These new systems will use two or more implanted components and include a multitude of sensing and actuating functions. Typical neuroprosthetic systems operate using implantable and/or body worn sensors to control implantable actuators in “real-time”. Multiple sensors provide inputs or feedback to the system – acquiring commands from the user or providing information about the state of the system. Sensor inputs range from simple logical inputs to multiple sources of continuous inputs. The implanted components, of necessity, will require the ability to communicate to external components over bidirectional wireless communication links.

Wireless communication should be real-time, low latency (5-20mS), low jitter, bidirectional, with sustained data transfer at relatively high rates (exceeding 150kbs) during active control. In addition, typical users of neuroprosthetic systems have the system operational for up to 16 hours a day, during which time the user may actively be providing function (standing, grasping, etc) for several hours. User function must be "on-demand" and immediately responsive. Further, all neuroprosthetic users are regular members of public society and should be allowed to use their systems (and hence wireless sub-systems) in an unrestricted manner, free from external interference.

This brief description is intended to provide an introduction to the role that wireless technology plays within the new neuroprosthetic systems that are now in development. As shown, next generation neuroprosthetic systems require wireless communication schemes that facilitate closed-loop, real-time, control. We offer no specific comment on the proposed rules per se, but encourage you not to increase latency and allow use in any environment. We believe that the wireless requirements of implantable and body-worn neuroprosthetic systems are significant, diverse, and should be considered in any new rule making concerning Medical Radio.

Please do not hesitate to contact me for further information on the role of wireless systems use in functional electrical stimulation.

Sincerely,

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